in pus in the anterior chamber and in a pannus; death occurred on the sixth day. Repetition of this experiment three times has resulted similarly.

A number of flies, after feeding in the carcass of an animal dead of the plague-like disease 48 hours previously, were allowed to crawl over an area of the skin of a healthy animal, prepared by shaving sufficiently close to produce an abrasion. Results, negative.

The above-outlined experiments are being extended and repeated for the purpose of learning whether the transmission of the plague-like disease from the carcass of an infected animal to the eye or mucous membranes of another animal, or to an abraded surface, is likely to become a factor of importance. Further information is also desirable regarding the transmission of plague by the stable fly, since this fly will feed on carcasses recently dead. Definite information might explain the occurrence of cases of this disease which do not lend themselves readily to an epidemiological explanation by flea transmission.

THE TUBERCULOSIS PROBLEM IN RURAL COMMUNITIES.

ITS MODERN ASPECT AND THE DUTY OF HEALTH OFFICERS.

By S. Adolphus Knopf, M. D., New York, N. Y.

On September 16, 1914, upon the invitation of the commissioner of health of New York State, I delivered an address at Saratoga Springs before the 700 sanitary officers of the State, assembled there for their annual conference. What I have seen, read, and learned from conversations with health officers in rural communities in other States, Territories, and in our Spanish-American possessions has convinced me that the conditions in those localities, while perhaps not exactly the same, still do not differ very materially from conditions in the State of New York. It would seem, therefore, that the publication of the address in the report of the United States Public Health Service, so widely read by the surgeons of the Public Health Service by health officers throughout the country, and by sanitarians and hygienists in general, might be helpful to some in their work of dealing with the tuberculosis problem in smaller communities. I have added some important items which, for want of time, I could not discuss when the address was delivered, but which I have reason to believe will enhance whatever value this communication may possess.

When I was first asked to speak on the subject of the tuberculosis problem in rural communities, I could not for the moment think that there should be any great difference between the tuberculosis problem in the city and in the town or village; but after some reflection I could well see that there is indeed quite a difference in the method by

which tuberculosis must be attacked in the community which, on the one hand, has not the administrative machinery of a large city, and where, on the other, because of the close personal relations, friendly and neighborly in many instances, the health officer seemingly is not always free to say and do what he thinks is best for the interest of the community at large.

Take, for example, the spitting nuisance. Many a worthy inhabitant of a small village or town, should he be forbidden to expectorate freely where he pleases when in winter he and his neighbors congregate around the warm stove in the grocery store or post office and solve the problems of the universe, would consider an antispitting regulation an infringement on his inalienable rights as a free citizen. The same would probably hold good if, when sitting in summer in front of his own home, he should dispose his accumulated pulmonary, bronchial, or salivary secretions or the juices of his chewing tobacco, on the sidewalk.

In countries like Cuba and our own Spanish-American possessions the spitting nuisance will be equally difficult to combat on the plaza, the place where the masses congregate, and it will require a great deal of tact on the part of the health officers of those Spanish-American communities to enforce antispitting regulations. It is difficult for the citizens of those localities to see how they may not only injure themselves and their families but the entire community by uncleanly and insanitary habits.

When, as happens not infrequently, the careless spitter is upheld by some worthy but retrogressive member of our profession, be it because of political or family antagonism to the present incumbent of the health office, then there surely will be discord and continued spitting. Of course there are exceptions, but I know that situations such as I have just described do occur, and they make the carrying out of sanitary regulations exceedingly difficult in rural communities.

Should there be any community progressive enough to have made tuberculosis a reportable disease, I can readily see that there might occasionally arise unpleasant feeling when the health officer insisted upon reporting such cases. The fear that after being reported a stigma will be fastened upon an individual or family is often an inducement to hide the disease. We all know the danger of the tuberculous individual to a community, small or large, when he behaves as if he were not tuberculous. Even if he should be careful at home because of the advice of a conscientious family physician, he will often be careless when away from home, disseminating his 7 billion bacilli per day by the deposit of his sputum where it will have a chance to dry and pulverize and be inhaled as bacilliferous dust by others. He may also propagate his disease through droplet infection. It is very strange how this latter source of infection is

sometimes overlooked by otherwise well-trained physicians. The expression "dry cough" is used even by some medical men, yet we all know that small particles of saliva are expelled during the cough, even if the individual does not expectorate.

Whenever the establishment of a provincial or local hospital for the care of tuberculous patients is contemplated, I know from experience what a prejudice the people have against the erection of such an institution in the vicinity of any community, and there is also a prejudice on the part of many tuberculous individuals against entering such an institution. We may put it this way: The most difficult phase of the tuberculosis problem in rural communities is phthisiophobia—the exaggerated fear of the presence of a tuberculous individual. On this fear is based the disinclination of prospective patients to have their chests examined during the onset of early symptoms, such as cough, loss of weight, rise of temperature, hoarseness, sanguineous expectoration, etc. They and their relatives fear being stigmatized in the event that tuberculosis is diagnosed and reported. In brief, phthisiophobia is responsible for the disinclination to obey antispitting laws, the disinclination of the community at large to have tuberculosis hospitals or sanatoria in the neighborhood, and last, but not least, the disinclination of individuals to enter these institutions for treatment and cure.

To some of the younger and less experienced physicians among my readers it may sound strange when I say that the majority of tuberculous individuals think themselves perfectly harmless and object to entering tuberculosis institutions for fear of becoming infected there; and this fear is not infrequently shared by other members of the family. We all know that the successful treatment in the home of the patient, while feasible in some instances, is impossible in many. Yet upon the early discovery and the prompt treatment of the tuberculous invalid, at the right time and in the right place, depends in no small degree the solution of the tuberculosis problem.

What can the health officer of a rural community do in the face of the tremendous difficulties which confront him in his honest and sincere effort to be helpful in the combat of tuberculosis? Let me answer this question by picturing my ideal of what such an officer should be.

First of all, the ideal health officer of a rural community must be an ideal man; he must be beloved for his personality, for his tact in dealing with patients, with his fellow physicians, and the other authorities in the community. He must be a thoroughly trained sanitarian. While it would be desirable for him to have a degree of doctor of public health besides the degree of doctor of medicine, this to my mind is not absolutely essential; but he must be a thoroughly

trained medical man to whom his fellow practitioners can look up and whom they can call on for counsel.

In one of the issues of the Public Health Reports,[1] the author, in deploring the fact that "there are exceedingly few men with requisite training from among whom the thousands of local health officers can be appointed," recommends a correspondence course in health administration and allied subjects for improving the efficiency of these officers. I most highly approve of this suggestion, but would urge that facilities for clinical instruction should be provided in addition, for the ideal health officer should not only be versed in sanitary science in general and be familiar with all the means of preventing endemic and epidemic diseases, but he should also be an expert diagnostician of communicable and contagious diseases, which knowledge can not be acquired by correspondence.

Besides being all this, he need not necessarily have the gift of oratory, but he should be able to give good practical talks to physicians and laymen on medical topics, sanitation, and the prevention of diseases. Last but not least, and I may say this with all due respect for the authorities, the health officer of any county must and should be paid a salary high enough to make him independent of practice, so as to enable him to devote all his time to his official duties. The position should be for life, as long as he is able to do his duty. It should never depend upon political preferment.

If the community is too small to maintain a well-paid health officer, let us follow the suggestion of Mr. George J. Nelbach, of the tuberculosis committee of the New York State Charities Aid Association, and unite a number of the smaller communities under the administration of one health officer, who because of being well paid can be held responsible for the sanitary conditions of the various communities comprising his sanitary district or unit.

And, now, what are the particular duties of this officer concerning the tuberculosis problem? After having united with his fellow practitioners of the community to form an antituberculosis league, after they have pledged themselves to aid him in a conscientious war, not against the tuberculous but against tuberculosis, he should give regular popular talks to the town or village folks on the prevention of this disease, of course always under the auspices of the local physicians. The conscientious health officer should prepare himself carefully for such tuberculosis conferences, for it is not so very easy to talk the language of science in the language of the people. Nothing is more difficult than to avoid scientific terms when accustomed to them, and at the same time nothing is more detrimental to the good effect of a

[1] The making of health officers—The possibility of State departments of health improving the efficiency of local health officers by means of correspondence courses in health administration and allied subjects, Public Health Reports, Sept. 4, 1914, p. 2299.

popular medical talk than the use of big words and phrases familiar to the medical ear, but sounding like Greek, Latin, or Hebrew to the lay hearer.

Let the lecturer begin by defining tuberculosis, not as a dangerous contagious disease, but merely as a communicable one, which becomes dangerous only through ignorance and carelessness. I ascribe the wonderful success of the antituberculosis work in New York City, inaugurated by the distinguished commissioner of health of the State of New York and my distinguished teacher, Hermann M. Biggs, to the fact that from the very onset of his propaganda he classified tuberculosis with the communicable and not with the contagious diseases. One must first overcome the fear of the disease to combat it successfully. It is a good thing to tell a lay audience that probably every one of them, or at least nine-tenths of them have or have had tuberculosis at one time or another in their lives, and that we are not at all certain that a slight attack of tuberculosis does not confer upon us a certain immunity to future attacks. The lecturer must explain, furthermore, that when we are in good health, thanks to the bactericidal quality of the Schneiderian membrane of our nose, the upward waving sciliæ in the upper respiratory tract, the phagocitic power of the antibodies in our blood, and the bacteria-killing power of the gastric secretions, we have natural factors of defense against tuberculosis. Otherwise, probably every one of us would be ill with the disease. Then let him emphasize, in as strong language as it can possibly be put in, the fact that the honest, conscientious consumptive, who takes care to avoid infecting others by his sputum or saliva, is not a danger to his fellow men and is as safe to associate with as anybody else.

To explain to a lay audience the difference between a contagious and a communicable disease, take smallpox as an example. It should be made clear to the hearers that no matter how clean and conscientious a smallpox patient may be, they should not go near him nor touch him unless they have been vaccinated and revaccinated, and that they should stay away from the smallpox hospital in general. On the other hand, the audience should be told that they may safely touch and shake hands with the conscientious consumptive and even kiss him on the forehead, if they must kiss, and nothing will happen to them. They can also be assured that the well-equipped and well-conducted tuberculosis hospital or sanatorium is the safest place not to catch consumption in.

In popular tuberculosis talks one should never fail to lay emphasis on the value of early diagnosis and impress upon one's hearers the fact that an annual or semiannual examination of their chests by their family physician is one of the safest, and, from every point of view, most profitable investments for retaining or gaining health

they could possibly make. Since the health officer counsels these people to be examined by their own physicians, they will see the altruism in his giving this valuable advice.

In reference to the tuberculosis institution, hospital, or sanatorium, we can also conscientiously say that because of the careful training of the patients and the splendid hygiene in vogue in such institutions no physician, no nurse, no visitor, nor healthy inmate ever contracted tuberculosis there. This also should be told to those who object, on sentimental or sanitary grounds, to the establishment of tuberculosis institutions in their neighborhood. The mortality from tuberculosis among the inhabitants of villages surrounding sanatoria invariably decreases with the establishment of such institutions. By existing statistics, which are available to all, it can be proven to those who object on account of depreciation of property values that real estate has improved in the vicinity of institutions for the tuberculous, and we will very quickly win over to our side the real-estate owner and the real-estate dealer.

In talks to the townspeople and farmers, and particularly to the women, the value of fresh air should be taught. They have so much in the country, and they make so little use of it; they should be told that the fear of night air is a nightmare, for night air is just as good as day air. In tropical countries the fear of the night air, particularly at the time of the full moon, amounts in many instances to an almost unconquerable superstition. Here again much patience, education of old and young, and tactful persistent agitation on the part of the health officers will be necessary to overcome the pernicious habit of sleeping with tightly closed windows and doors which is so prevalent in tropical countries. Of course, we all know that this fear of night air in these countries originated in the fear of contracting yellow or malarial fever during the night, and prior to the immortal discoveries of Reed and Laveran and the works of Gorgas, even physicians looked upon the night air in tropical countries as a propagator of these diseases.

Children and adults should be taught the art of deep breathing; adult audiences should be told all about the necessity for proper food and regular habits and also the danger of intemperance, since alcohol is a strong predisposing factor to tuberculosis.

The habit of cigarette smoking among the adults, male and female, and, alas, among children, will be even harder to overcome in countries like Mexico and Cuba than in the United States and Canada. Yet that excessive cigarette smoking, particularly because the smoke is inhaled deeply into the lungs, is one of the predisposing factors to diseases of the respiratory tract, particularly of the larynx and the lungs, needs no further argument to be proved. Excessive cigarette smoking lessens the vitality of the individual and makes him more

susceptible to the invasion of the germs of tuberculosis, pneumonia, grippe, etc.

In Mexican and Cuban communities the health officer will, I believe, have to have qualifications more than the ordinary mortal possesses in order to be successful in an anticigarette crusade among the adults, but he may be able to do a great deal for the children. If he and the teachers will unite to show the impressionable children that cigarette smoking is detrimental to their physical and mental development and that it will render them susceptible to an early nervous and mental breakdown, they will listen and obey, and thus a vast amount of good can be accomplished and cigarette smoking among children perhaps become unpopular. But let me say in passing that nothing impresses a child so much, teaches him something so thoroughly, as example, and unless the health officer and the teacher cease smoking cigarettes themselves their anticigarette talks to children will make very little impression.

The health officer should insist upon the enforcement of antispitting laws, and should have the people do away with the roller towel at home, in hotels, and in other public or private washrooms. In the United States, Canada, Cuba, and Mexico there are any number of hotels in which the roller towel and the common drinking cup seem still to be permanent fixtures and badly kept spittoons the usual ornament of the lobbies and public assembly rooms.

Outdoor sleeping, which can be carried out so much more easily in smaller communities than in larger ones should be encouraged. The chiming of bells and the striking of the town clock between the hours of 9 p. m. and 7 a. m. should be stopped, as well as other unnecsary and distressing street noises; they are as bad for the nerves of the indoor as the outdoor sleeper, and it is as bad for the nontuberculous as for the tuberculous to be kept awake at night. Except in small villages, I do not see any earthly reason why the rooster nuisance could not also be done away with, as has been done in New York City, where we recently passed a regulation which will go into effect on November 1, 1914. This regulation will not permit residents of the city of Greater New York to keep roosters; it will also prohibit persons from raising chickens in their back yards where there is another residence or public institution within 75 feet of the poultry inclosure.

The hygiene of rural schools must be improved. In the larger cities we erect the most beautiful buildings for our school children; in some villages and small towns, anything from an old barn to the old-fashioned red brick building with low ceiling, with little or no ventilation and bad lighting, has to serve. These schools should be remodeled into open-air schools or new ones built, in which there should be plenty of open-air classrooms. I have said before, and I am willing to say it again, that in my humble opinion open-air

schools, at least for primary grades, must become the rule, and indoor classes the exception, if we wish to prevent and combat tuberculosis in childhood.

In warm or semitropical countries, particularly in the villages, open-air schools should predominate and a good part of the time the smaller children could be taught entirely in the open air. I believe, moreover, that there are many branches in the curriculum of even the higher classes of our public schools that could be taught with advantage in the open air, particularly such studies as can be combined with excursions, such as botany, topography, geography, geology, etc. Weather permitting, calisthenics, singing, and recitation should always be done in the open air. Nothing seems to tend to develop children's chests so much as just such exercises when taken in the open air. The health officer should be the counselor to the school superintendent and teachers, not only in all that appertains to the prevention and spread of diseases, but also in all that tends to strengthen the physique of the children.

Health officers should concern themselves even with the hygiene of the churches. Places of worship should be properly ventilated and frequently cleaned. In Protestant churches the use of individual communion cups should be advocated, and in Catholic churches careful attention should be paid to the frequent disinfection of crosses and other articles of adoration, often kissed by the devout.

Antituberculosis talks should be given to priests, ministers, and teachers, or directly to the children, and popular medical literature distributed in schools for the children to take home will make fresh-air apostles of these little ones and reach the old folks at home, thus combating the tendency to tuberculosis in the adults and in the young.

The laws against bovine tuberculosis should be enforced, for we must bear in mind that 10 per cent of the tuberculosis in childhood is due to the bovine type of the disease. All milk, except such as comes from cows periodically tested with tuberculin, should be sterilized. No individual with an open pulmonary tuberculosis (when the disease is active and bacilli are found in the sputum) should be employed in a dairy or in the handling of milk in stores.

All suspected sputum sent to the health officer must be carefully examined, but the physicians sending these specimens should be told that often several specimens are necessary in order to find the tuberculosis germ; and it can not be repeated too often that while the presence of tubercle bacilli in the pulmonary secretion of the individual is absolute proof of the existence of the disease, the absence of the germ does by no means prove that there is no tuberculosis. In the earlier stages of the pulmonary type of tuberculosis, because of slight disintegration of pulmonary tissue, the germs of the disease are found but rarely, and yet it is in this early stage that we can most

hope for complete recovery. It is therefore of vast importance that every community should have physicians who are experts in the physical diagnosis of the disease in its earliest stages, and the health officer of a community should be particularly qualified to aid his fellow physicians in the early discovery of tuberculosis.

Health officers should see to it that every patient with open tuberculosis receives hospital and sanatorium care, or at least gets his sanatorium treatment under intelligent guidance at home. There should be no uncared for tuberculous individual in any community which has an efficient health officer and an intelligent municipal or county government. The sanatorium should be made a center of education for physicians and laymen, and hospitals for advanced cases should be made attractive, so that those who ought to enter will enter willingly and gladly because they will receive better treatment there than they could at home. If the institution has cheerful and attractive features they will miss the home less.

The consumptive is the ideal victim of the quack, charletan, and vendor of patent medicines, and this is particularly true of the consumptive who lives in rural communities, where often the local papers derive their greatest income from advertising nostrums and sure cures for consumption and other diseases. There should be a health publicity column in the local paper to enlighten the public. If necessary, the provincial or local department of health should pay for this, to compensate the poor editor for his loss of quack advertisements. The laity should be told that there is no sure cure for consumption; that good air, rest, and good food under careful medical supervision, and the scientific administration of medicine to relieve distressing symptoms are, up to this date, our only means of curing tuberculosis, and that every advertisement of a sure consumption cure cloaks a swindle.

In all talks to laymen the health officer should try to imbue his hearers with his own enthusiasm and devotion to the tuberculosis cause. He should tell them that tuberculosis is not merely a medical disease, but that it has a very large social aspect. Bad housing, overcrowding, dangerous congestion, and even underfeeding exist, alas, not only in our large cities, but also in smaller communities. Wealthy and influential citizens should be shown what great good they can accomplish by becoming interested in the amelioration of such conditions as are conducive to the spread of tuberculosis. They will themselves benefit in the end from a clean and healthy community. Personal service to the consumptive poor, and kind, generous, and considerate actions toward those afflicted with tuberculosis, rich and poor alike, will create a better and more helpful feeling throughout the community.

It is essential, in order to prevent and cure the disease, that the laymen and physicians of the community, whether the community is large or small, should forget their little social, political, or religious differences, and work hand in hand for the common good.

From what has been said it will be seen what a great task the health officer of a small community has before him if he wishes successfully to combat tuberculosis. It would certainly seem easier in the larger cities, but there is one advantage the health officer of a small community has over his colleague in the city, and that is the knowledge of existing conditions by personal observation. If he will but have it for his maxim to make earnest and conscientious war against tuberculosis, but no war against the tuberculous invalid; if he has the greatest consideration for the welfare of the latter and thus for the welfare of the community at large, the health officer is bound to succeed; he will ingratiate himself with his fellow practitioners and with the community which he serves.

PLAGUE-ERADICATIVE WORK.

CALIFORNIA.

The following reports of plague-eradication work in California have been received from Passed Asst. Surg. Hurley, of the United States Public Health Service, in temporary charge of the work:

WEEK ENDED NOVEMBER 21, 1914.

SAN FRANCISCO, CAL.

Premises inspected	1,659
Premises destroyed	11
Nuisances abated	241
Poisons placed	5,400
Average number of traps set daily	875

RATS COLLECTED AND EXAMINED FOR PLAGUE.

Collected	276
Examined	164
Found infected	0

RATS IDENTIFIED.

Mus norvegicus	15
Mus rattus	84
Mus alexandrinus	100
Mus musculus	77

Squirrels collected and examined for plague.

County.	Collected.	Examined.	Found infected.
Contra Costa	67	67	None.
San Benito	29	29	Do.
Total	96	96	Do.

Ranches inspected and hunted over.

Contra Costa County	26
San Benito County	6
Total	32